Dementia Risk Prediction

European Heart Journal (2014) **35**, 1925–1931
doi:10.1093/eurheartj/ehu207

REVIEW

Statistical tutorials

Towards better clinical prediction models: seven steps for development and an ABCD for validation

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Received 7 October 2013; revised 22 April 2014; accepted 30 April 2014; online publish-ahead-of-print 4 June 2014

Risk prediction models: I. Development, internal validation, and assessing the incremental value of a new (bio)marker

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Risk prediction models: II. External validation, model updating, and impact assessment

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RISK PREDICTION ALGORITHMS

- Reviews (2017, 2019) concluded that:
  - Most risk prediction models not internally nor externally validated
  - Large differences in the study design of the studies used for risk prediction (ex: from cross sectional datasets, to longitudinal studies of different duration)
  - Large differences in the variables included in the different models
  - Inconsistent timeframe across studies and unclear data handling

Risk score for the prediction of dementia risk in 20 years among middle aged people: a longitudinal, population-based study

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Summary

Background Several vascular risk factors are associated with dementia. We sought to develop a simple method for the prediction of the risk of late-life dementia in people of middle age on the basis of their risk profiles.

Methods Data were used from the population-based CAIDE study, which included 1409 individuals who were studied in midlife and re-examined 20 years later for signs of dementia. Several midlife vascular risk factors were studied to create the scoring tool. The score values were estimated on the basis of β coefficients and the dementia risk score was the sum of these individual scores (range 0–15).

Findings Occurrence of dementia during the 20 years of follow-up was 4%. Future dementia was significantly predicted by high age (≥47 years), low education (<10 years), hypertension, hypercholesterolaemia, and obesity. The dementia risk score predicted dementia well (area under curve 0·77; 95% CI 0·71–0·83). The risk of dementia according to the categories of the dementia risk score was 1·0% for those with a score of 0–5, 1·9% for a score of 6–7, 4·2% for a score of 8–9, 7·4% for a score of 10–11, and 16·4% for a score of 12–15. When the cut-off of 9 points or more was applied the sensitivity was 0·77, the specificity was 0·63, and the negative predictive value was 0·98.

Interpretation The dementia risk score is a novel approach for the prediction of dementia risk, but should be validated and further improved to increase its predictive value. This approach highlights the role of vascular factors in the development of dementia and could help to identify individuals who might benefit from intensive lifestyle consultations and pharmacological interventions.

Lancet Neurol 2006; 5: 735–41

Published Online
August 3, 2006
DOI:10.1016/S1474-4422(06)70537-3

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The classic: CAIDE score (this paper as it is a “classic” from which many other papers borrowed from.)

Logistic regression

The Lancet Commissions

Dementia prevention, intervention, and care: 2020 report of the *Lancet* Commission

Gill Livingston, Jonathan Huntley, Andrew Sommerlad, David Ames, Clive Ballard, Sube Banerjee, Carol Brayne, Alistair Burns, Jiska Cohen-Mansfield, Claudia Cooper, Sergi G Costafreda, Amit Dias, Nick Fox, Laura N Gitlin, Robert Howard, Helen C Kales, Mika Kivimäki, Eric B Larson, Adesola Ogunniyi, Vasiliki Orgeta, Karen Ritchie, Kenneth Rockwood, Elizabeth L Sampson, Quincy Samus, Lon S Schneider, Geir Selbæk, Linda Teri, Naaheed Mukadam

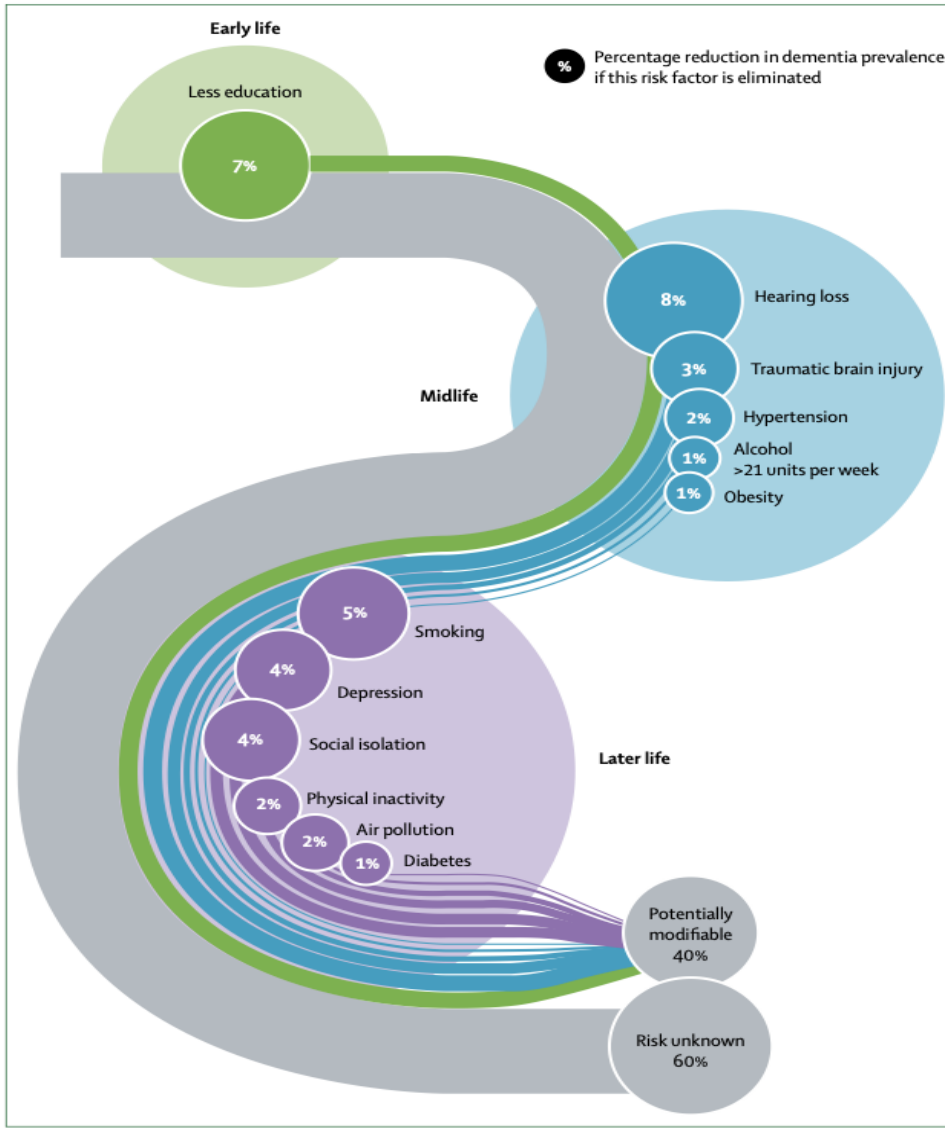

***Figure 7*: Population attributable fraction of potentially modifiable risk factors for dementia**